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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/748,045	12/31/2003	Young-Hun Seo	040021-0307487	6814
909	7590	11/29/2004	EXAMINER PERT, EVAN T	
PILLSBURY WINTHROP, LLP P.O. BOX 10500 MCLEAN, VA 22102			ART UNIT 2829	PAPER NUMBER

DATE MAILED: 11/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/748,045

Applicant(s)

SEO, YOUNG-HUN

Examiner

Evan Pert

Art Unit

2829

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 December 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 1203.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

2. The drawings are non-compliant with 37 CFR 1.84 (p)(3), which states that lettering and numbering of drawings "must" measure at least 1/8-inch height. For example, the figure captions "Fig. 2a", etc. are less than 1/8-inch height.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 5 are rejected under 35 U.S.C. 102(b) as being anticipated by Ning (US 6,451,667).

Regarding claim 1, Ning discloses a method of fabricating a thin film capacitor (i.e. a MIM capacitor), the method comprising the steps of: forming a first via and a second via (i.e. a first via "trench" and a second via "trench" because applicant defines a pair of "vias" to include a "two-line shape," per page 3, line 19, otherwise known as a pair of "trenches"), which are isolated with a predetermined distance (seen in Fig. 2) by selectively etching (col. 3, lines 58-59) an interlayer insulating film (122) formed over the entire structure of a semiconductor substrate (col. 3, lines 44-49);

filling in the first via and the second via with a first metal material (i.e. conductive material lines 124), forming a capacitor window (i.e. interconnection of trenches 130) by etching the interlayer insulating film (122) between the first via and the second via (i.e. between "line vias" 124) to have a predetermined depth (e.g. Fig. 4 in view col. 3, line 58 to col. 4, line 6); forming a dielectric layer (134) on an inner wall (e.g. inner wall 137); and forming a second metal material (136) to fill in the capacitor window.

Regarding claim 5, Ning discloses that the second metal material (136) is formed of W, Ti, TiN or Al [col. 5, lines 6-11].

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2-4 and 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ning as applied to claim 1 above.

Regarding claim 2, Ning does not detail exactly how the first and second via trenches are formed, only that "insulating layer 122 is patterned, etched, and filled with a conductive material to form conductive lines 124."

In other words, Ning does not explicitly recite the well-known limitations of claim 2 of "applying a photoresistive film" (i.e. a photoresist) on the interlayer insulating film (122) and "exposing and developing form a photoresistive film pattern" which exposes a portion of the interlayer insulating film where via trenches are to be formed, and then "etching the exposed insulating film (122) using the photoresistive film pattern as a mask."

Ning does detail that the capacitor window (i.e. interconnection of trenches 130) is formed by photoresist patterned with UV, followed by etching of exposed regions, as is notoriously well known in the art of photolithography for semiconductor device manufacture.

It would have been obvious to one of ordinary skill in the art at the time of the claimed invention to form the via trenches (124) "by applying a photoresistive film (i.e. a photoresist) on the interlayer insulating film (122) and exposing and developing the photoresistive film to form a photoresistive film pattern which exposes a portion of the interlayer insulating film where the via trenches having linear shape are to be formed," and then "etching the exposed interlayer insulating film using the photoresistive film pattern as a mask to form the via trenches."

One of ordinary skill in the art would have been motivated to adopt photolithography for the formation of via trenches 124, requiring patterning a photoresist by exposure and development and etching using the patterned photoresist as a mask, because photolithography is an efficient method to form all of the via trenches 124 at the same time in Ning, such that all via trenches 124 can be "patterned" and "etched" as required by Ning (col. 3, lines 58-59), simultaneously, without a need to form and pattern each via trench 124 one at a time, by laser drilling for example [see MPEP 2144 for source of rationale to adopt photolithography for formation of via trenches 124 in Ning when Ning already discloses photolithography for trenches 130, yet generalizes formation of trenches 124].

Regarding claim 3, in Ning, the via trenches are filled with tungsten 136 (col. 5, line 8) and a CMP process exposes the insulating film (e.g. Fig. 10 in view of col. 5, lines 12-17).

Regarding claim 4, in Ning, the dielectric layer (134) is formed by forming a dielectric layer (134) on the entire upper surface of the first metal material and the interlayer insulating film (col. 4, lines 58-60) and forming the second metal material (136) on the dielectric layer to fill in the capacitor window, and then carrying out the planarization process of a CMP until the interlayer insulating film and the first material are exposed [e.g. Fig. 10].

Regarding claims 6-8, in Ning, the second metal material (136) is any of W, Ti, TiN or Al [col. 5, lines 6-11].

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Evan Pert whose telephone number is 571-272-1969. The examiner can normally be reached on M-F (7:30AM-3:30 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Tokar can be reached on 571-272-1812. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ETP
November 23, 2004


EVAN PERT
PRIMARY EXAMINER